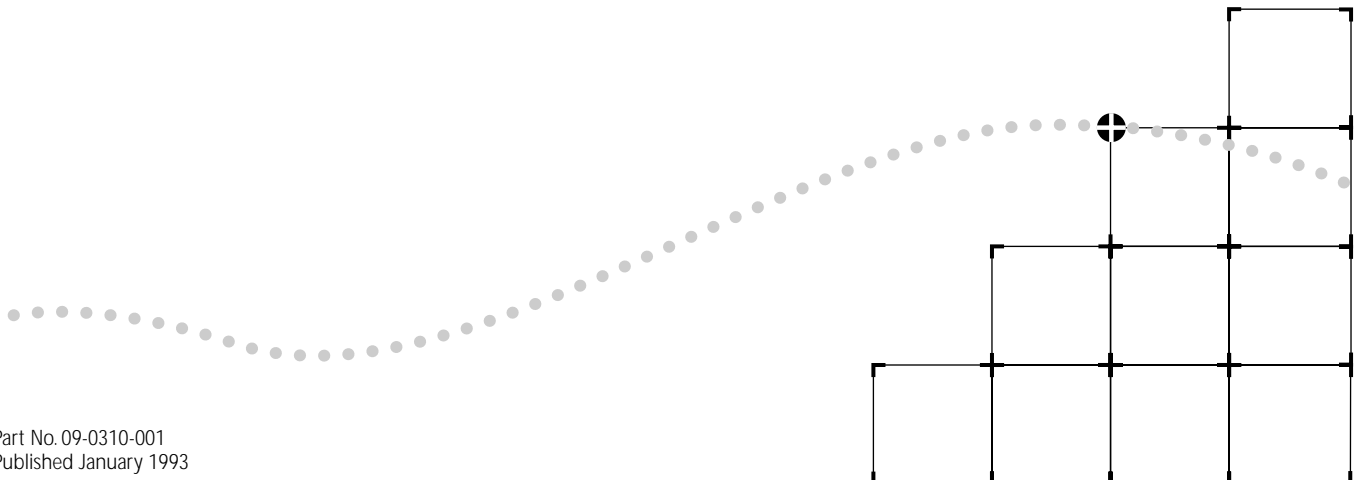




NETBUILDER II[®] HIGH-SPEED SERIAL V.35/RS-232 MODULE INSTALLATION GUIDE

A member of the NETBuilder[®] family



3Com Corporation ■ 5400 Bayfront Plaza ■ Santa Clara, California ■ 95052-8145

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 **CAUTION:** *The connector port on the HSS V.35 module does not provide isolation sufficient to satisfy the requirements of the relevant parts of BS 6301. Apparatus connected to it must have been approved to the relevant parts of BS 6301 or have previously been evaluated against British Telecom (Post Office) Technical Guides 2 or 26 and given permission to attach. Other usage will invalidate any approval given to the apparatus.*

Interconnect directly, or by way of other apparatus, of ports marked "SAFETY WARNING - See Instructions for Use" as indicated above, with ports marked or not so marked may produce hazardous conditions on the network and advice should be obtained from a competent engineer before such a connection is made.

ABOUT THIS GUIDE

Introduction

This guide describes how to install, cable, maintain, and troubleshoot the High-Speed Serial (HSS) RS-449 module for the NETBuilder II[®] base system with a 4- or 8-Slot chassis. Information applies to both chassis whenever the generic NETBuilder II system name is used in a description. References to the 4-Slot or 8-Slot chassis are specifically identified.

For more information on the NETBuilder II base system installation or bridge/router software, refer to the *NETBuilder II Base System Installation Guide*.

This guide is intended for the system administrator, network equipment installer, or network manager who is responsible for installing and managing the network hardware. It assumes a working knowledge of network operations, but does not assume prior knowledge of 3Com[®] internetworking equipment.



If the information in the release notes shipped with your product differs from the information in this guide, follow the release notes.


Conventions

Table 2 and Table 1 list conventions that are used throughout this guide.

Table 1 Notice Icons

Icon	Type	Description
	Information Note	Information notes call attention to important features or instructions.
	Caution	Cautions alert you to personal safety risk, system damage, or loss of data.
	Warning	Warnings alert you to the risk of severe personal injury.

Table 2 Text Conventions

Convention	Description
"Enter" vs. "Type"	When the word "enter" is used in this guide, it means type something, then press the Return or Enter key. Do not press the Return or Enter key when an instruction simply says "type."
"Syntax" vs. "Command"	<p>When the word "syntax" is used in this guide, it indicates that the general form of a command syntax is provided. You must evaluate the syntax and supply the appropriate port, path, value, address, or string; for example:</p> <p>Enable RIPIP by using the following syntax:</p> <pre>SETDefault !<port> -RIPIP CONTrol = Listen</pre> <p>In this example, you must supply a port number for !<port>.</p> <p>When the word "command" is used in this guide, it indicates that all variables in the command have been supplied and you can enter the command as shown in text; for example:</p> <p>Remove the IP address by entering the following command:</p> <pre>SETDefault !0 -IP NETaddr = 0.0.0.0</pre> <p> For consistency and clarity, the full form syntax (upper- and lowercase letters) is provided. However, you can enter the abbreviated form of a command by typing only the uppercase portion and supplying the appropriate port, path, address, value, and so forth. You can enter the command in either upper- or lowercase letters at the prompt.</p>
Text represented as screen display	<p>This <code>typeface</code> is used to represent displays that appear on your terminal screen, for example:</p> <pre>NetLogin:</pre>
Text represented as commands	<p>This typeface is used to represent commands that you enter, for example:</p> <pre>SETDefault !0 -IP NETaddr = 0.0.0.0</pre>
Keys	<p>When specific keys are referred to in the text, they are called out by their labels, such as "the Return key" or "the Escape key," or they may be shown as [Return] or [Esc].</p> <p>If two or more keys are to be pressed simultaneously, the keys are linked with a plus sign (+), for example:</p> <p>Press [Ctrl]+[Alt]+[Del].</p>
<i>Italics</i>	<i>Italics</i> are used to denote <i>new terms</i> or <i>emphasis</i> .

1

OVERVIEW

This chapter describes the High-Speed Serial (HSS) V.35/RS-232 module for the NETBuilder II base system and provides a brief summary of its features. The HSS V.35 module, as it will be referred to in this guide, contains the interfaces to the NETBuilder II I/O bus, the functional operating components of the board, and the interfaces to a modem or other serial device.

HSS V.35 Module Components

The NETBuilder II system is a modular internetworking platform. The HSS V.35 module board provides one HSS V.35/RS-232 interface for the NETBuilder II base system.



The HSS V.35 or the RS-232 module must be used with NETBuilder software version 5.2 or later.

Board

Figure 1-1 shows the surface of the HSS V.35 module board with the major components and shows the connector/LED panel with the connector and the LED indicator light.

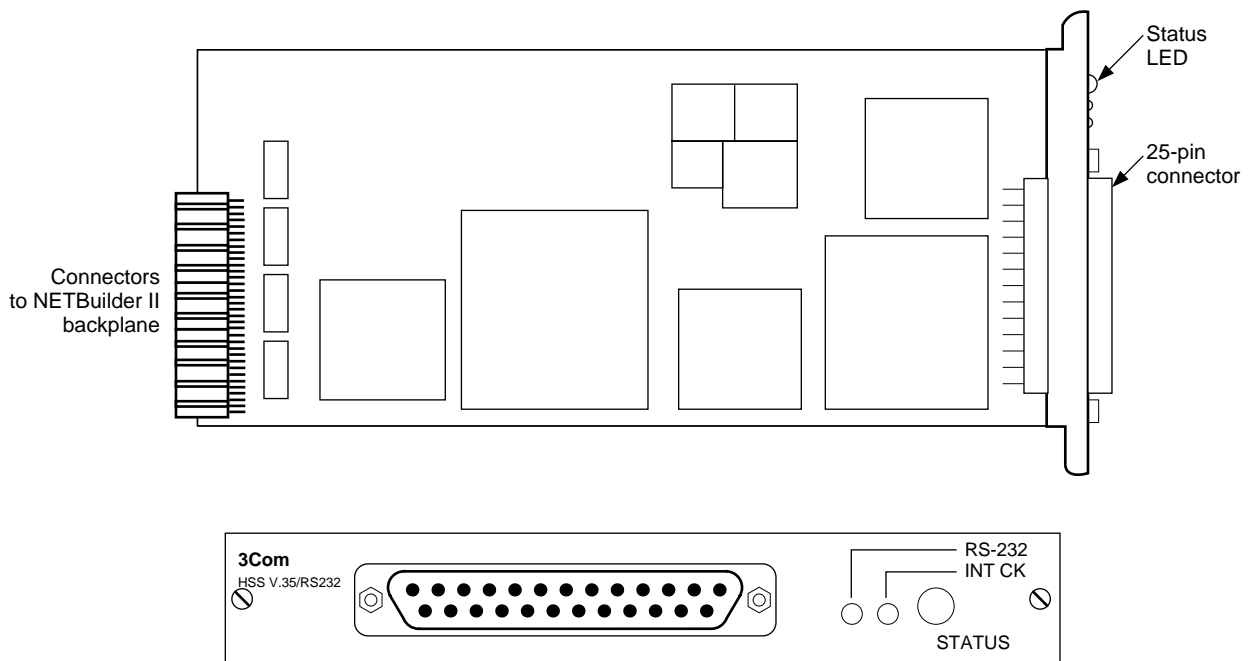


Figure 1-1 HSS V.35 I/O Module Board and Connector/LED Panel

Table 1-1 and Table 1-2 briefly describe the HSS V.35 module's internal and external components.

Table 1-1 HSS V.35 Module External Components

Component	Description
Interface board	HSS V.35 interface board with its own bus
I/O bus interface and connectors	Includes the connector, miscellaneous discretes, and the core memory peripheral interface (CMPI)
Line interfaces and connectors	Supports V.35 or RS-232 interfaces with a 25-single-pin connector
LED	Indicates startup, operational, and self-test diagnostic status

Table 1-2 HSS V.35 Module Internal Components

Component	Description
Core memory peripheral interface (CMPI)	Interfaces between the controller and the NETBuilder II backplane
Controller	Provides the basic data link controller functions
Electrically erasable programmable read-only memory (EEPROM)	Contains status and configuration information
Soft-start circuit	Supports the hot-swap feature (described in Table 1-4).

Status LED

The HSS V.35 has one tricolor LED and two green LEDs. The LEDs are located on the HSS V.35 module's connector/LED panel. Table 1-3 lists the different states of the STATUS LED and their meanings.

Table 1-3 HSS V.35 Module STATUS LED States

LED	State	Normal Behavior	Indicates
STATUS	Off	Off	Module is not functioning; it is either disabled or there is no power to the system
	Red	Off	Error condition
	Green	On continuously	Module is functioning normally
	Yellow	Off	Module is in self-test mode
INT CK		OFF	External clock source
		ON	Internal clock source
RS-232		OFF	V.35 Interface
		ON	RS-232 Interface

Serial Interface Connector

The HSS V.35 module's connector/LED panel has one connector for access to the modem or data service unit (CSU/DSU) interfaces. For serial devices with a V.35 interface, a 3Com-supplied pigtail cable converts the 25-pin connector to a V.35 connector. Serial devices with an RS-232 interface require a cable with two male 25-pin connectors. Cabling and pin assignments for a V.35 or RS-232 interface are described in Chapter 2, "HSS V.35/RS-232 Module Installation."

Figure 1-2 shows an example of a typical HSS V.35 and NETBuilder II network, using either V.35 or RS-232 connections.

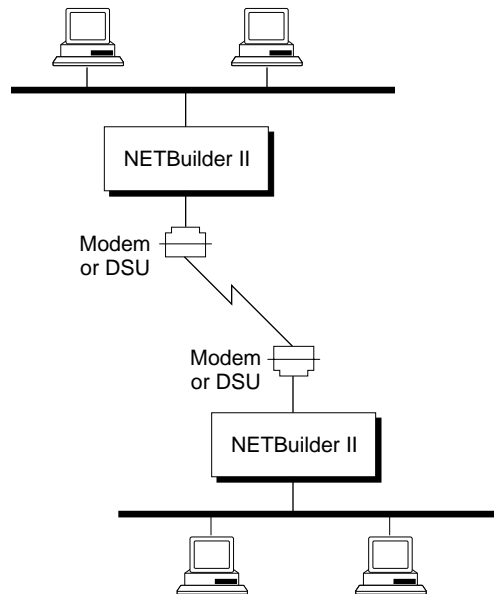


Figure 1-2 Typical HSS V.35 and NETBuilder II Network

HSS V.35 Module Features

Table 1-4 summarizes the HSS V.35 module features.

Table 1-4 HSS V.35 Module Features

Feature	Summary
Hot-swap capability	Allows you to install or remove and reinstall an HSS V.35 module without turning off the NETBuilder base system.
Cable support	3Com-provided V.35 pigtail cable for serial devices with a V.35 interface; RS-232 interface requires cable with two male DB-25 connectors (see Chapter 2, <i>Installation</i> , for details).
Line speeds	Range: 9.6 kbps to 3.1 Mbps. (RS-232 maximum is 64K)
Clocking	Internal or external.
Interface	V.35 or RS-232.
Self-test and diagnostic capability	Monitors network and signals status via the LEDs.
Accessible information on the EEPROM	Provides HSS V.35 module product information and repair data that can be accessed via the monitor utility. Refer to the <i>NETBuilder II Base System Installation Guide</i> for details on accessing HSS V.35 module EEPROM information.



Line speeds, clocking, and interfaces are selected via software. Refer to the manuals that shipped with your product.

2

INSTALLATION

This chapter describes how to install the HSS V.35 I/O module into the NETBuilder II base system.



Refer to the release note for the NETBuilder II Base System Installation Guide to determine configurations supported by the NETBuilder II base system.

Before Installing the Module

Before you install the module, follow these preliminary steps:

1 Observe appropriate ESD precautions.

Electrostatic discharge (ESD) can damage circuit board components. Failures resulting from ESD may not be covered under your warranty. To prevent this, follow these handling procedures:

- Keep the module in its antistatic shielded bag until you are ready to install it.
- Do not touch pins, leads, or solder connections on the board.
- Handle the board by the edges only.
- Store or ship the HSS V.35 module in static-protective packaging.

Observe proper grounding techniques when handling the HSS V.35 module. These techniques include using a foot strap and grounded mat, or wearing a grounded static discharge wrist strap.

2 Inspect the HSS V.35 module for shipping damage.

If you find any damage, contact the shipping company to file a report. If the module must be returned to your network supplier, ship it in its original shipping carton. If the original carton was damaged in shipment, repack the system in a carton that provides equivalent protection.

3 Verify that you have received a board plus a V.35 adapter cable.

If any item is missing from an undamaged carton, contact your network supplier to secure replacement.

4 Write down the serial number and the MAC address from the labels on the component side of the HSS V.35 board (see Figure 2-1).

This information is accessible using the monitor utility (see Table 1-4).

Serial number example: S/N: 1AJ12345

MAC address example: 0800021A4B5C

You will need this information if you have to contact your network supplier.

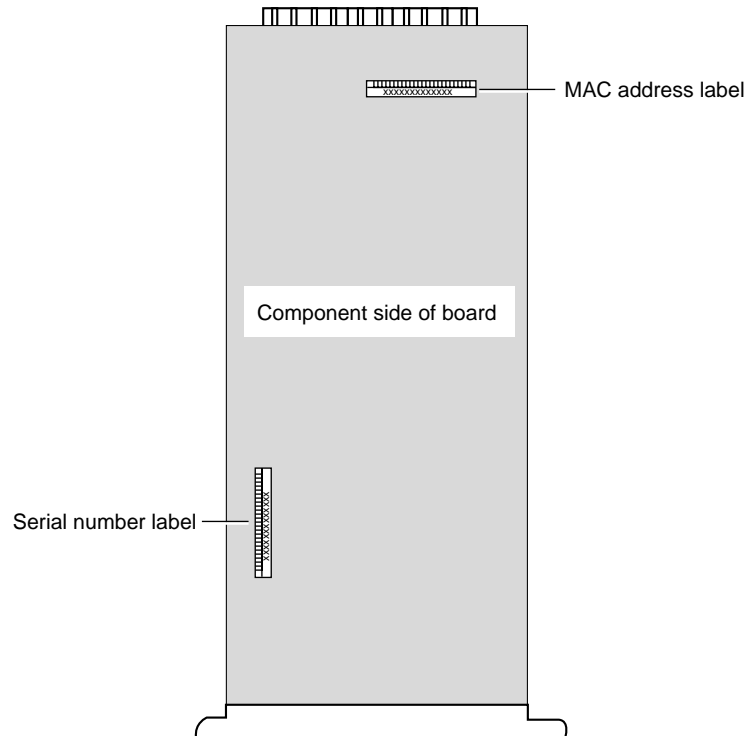


Figure 2-1 Serial Number on the HSS V.35 Module

The MAC address is also encoded in the HSS module's EEPROM. Refer to the *NETBuilder II Base System Installation Guide* for instructions on accessing the MAC address encoded in the EEPROM.

- 5 Verify that you have the appropriate serial interface cable and connector (V.35 or RS-232) for connecting the HSS V.35 module to the serial device.

For serial devices with a V.35 interface, an adapter (pigtail) cable (3Com-supplied) is required to convert the 25-pin connector to the V.35 connector.

Serial devices with an RS-232 interface require an RS-232 cable with two male DB-25 connectors. See "Connecting the Module to a Modem or Serial Device" for a detailed description.

- 6 Select the slot for the HSS V.35 module.

You can install the module into any available I/O slot in the rear of the NETBuilder II system. The wide top slot is designated for the CEC module only.

- 7 Using a flathead screwdriver (if necessary), remove the blanking plate from the selected I/O slot for the HSS V.35 module (see Figure 2-2).

- a Loosen the captive screws.
- b Push the ejector clips apart and slide the blanking plate from the slot.



CAUTION: Remove the blanking plate only from I/O slots that will house an I/O module. All unused I/O slots require the blanking plate covers to maintain proper cooling of the unit and regulatory compliance. Failure to cover open slots can result in overheating of the NETBuilder II base system and voiding of the warranty.

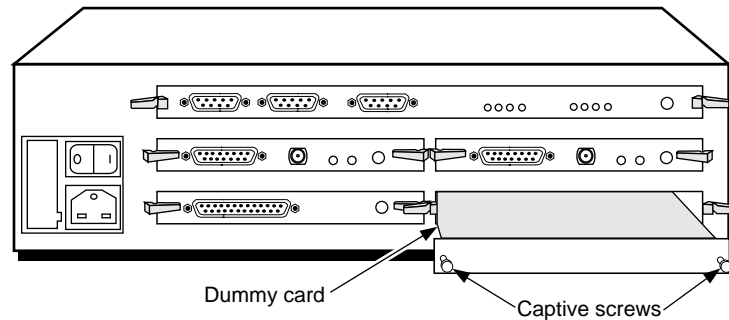


Figure 2-2 Removing a Blanking Plate



All NETBuilder II chassis are shipped with two open slots. 3Com recommends that you use these open slots for your first installations. Leave the other blanking plates in place until the slots are needed for additional module installation.

Once you have performed all the preinstallation steps, you are ready to install the HSS V.35 module.

Installing the HSS V.35 Module

Complete HSS V.35 module installation involves inserting the module into the NETBuilder II base system to connect with the backplane, then connecting to the network.

Inserting the Module

Insert the HSS V.35 module by performing the following steps:



All NETBuilder II chassis are shipped with two open slots. 3Com recommends that you use these open slots for your first installations. Leave the other blanking plates in place until the slots are needed for additional module installation.

- 1 Insert the HSS V.35 module into the uncovered I/O slot.
 - a Make sure the slot ejector handles are in an open position, as shown in Figure 2-3.
 - b With the connector end toward the backplane and the board panel facing you, grasp the left and right sides of the panel and fit the board into the I/O slot opening.
The board fits in only one way, but to be sure the correct side is facing up, check that the label imprints on the connector/LED panel are right side up.
 - c Slide the board in until the I/O panel edges just engage with the notches in the ejector handles.
- 2 Press the ejector handles on both sides of the I/O slot forward and together (toward the connector/LED panel) to engage the module and backplane connectors and secure the module board in the slot.

Figure 2-3 shows ejector handles in open and closed positions.

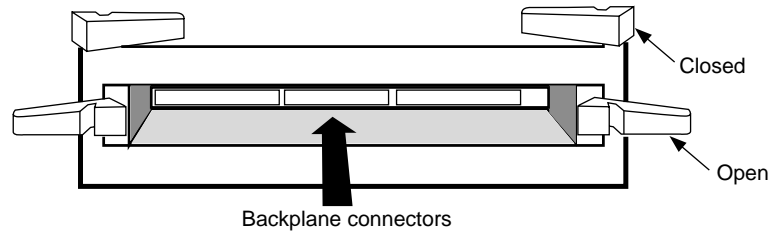


Figure 2-3 View of Open and Closed I/O Slot Ejector Handles

You will feel a slight resistance as you press these clips into the closed position; it will be the connectors engaging.



CAUTION: *If the resistance is too great, the module and backplane connectors may not be aligned. Forcing the module forward can damage the board or backplane connectors. Remove and reinsert the module, making sure the connectors are properly aligned.*

- 3 Check that the connector/LED panel of the newly inserted module is flush with the NETBuilder II chassis, and is aligned with the connector/LED panel(s) of any other installed module(s) to verify that the board is seated correctly (see Figure 2-4).
- 4 Use your fingers to attach the two captive screws, then tighten them “finger-tight” only.

A solid connection of the I/O panel to the chassis is required for proper operation, but the screws should *not* be used to force the board into place.

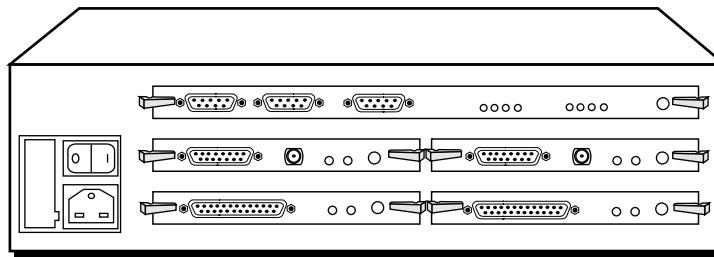


Figure 2-4 HSS V.35 Module Board Installed

Connecting the Module to a Modem or Serial Device

Table 2-1 describes the pin assignments for the female DB-25 connector on the HSS V.35 module. The interface operates electrically as a DTE. The table specifies the required pinout configuration for a DTE-to-DCE cable.

- The V.35 interface cable uses a male DB-25 connector and a female 34-pin V.35 block.
- The RS-232 interface cable uses two male DB-25 connectors. The RS-232 cable can be either a 25-pin straight through or a 25-pin to 9-pin, depending on the modem or serial device you are using. Refer to the manual for your selected modem or serial device.

3Com recommends using minimum lengths of V.35 or RS-232 cable, especially if you plan to use these serial lines at high speeds.

Table 2-1 HSS V.35 Module V.35 and RS-232 Connector Pin Assignments

HSS V.35 Pin Number	Signal Name	V.35 Pin Number/ID	RS-232 Pin Number
1	Chassis Ground	A	1
2	TD		2
3	RD		3
4	RTS	C	4
5	CTS	D	5
6	DSR	E	6
7	Signal ground	B	7
8	DCD	F	8
9	RDA	R	
10	RDB	T	
11	Unassigned		
12	SCRA	V	
13	SCRB	X	
14	SDA	P	
15	TXCI		15
16	SDB	S	
17	RXCI		17
18	SCTEA	U	
19	SCTEB	W	
20	DTR	H	20
21	SCTA	Y	
22	SCTB	a	
23	RXCO		
24	TXCO		24
25	Unassigned		



The ground shield should be connected to the cable shield (Pin 1)

To connect to a modem or serial device, follow these steps:

- 1 Configure the relevant PATH Service parameters in the bridge/router software (refer to the *NETBuilder Family Bridge/Router Operation Guide* for information on the PATH Service parameters).
- 2 To connect the HSS V.35 module to the network, complete the following steps:
 - a Connect the appropriate cable from the modem or serial device to the HSS V.35 module connector (Figure 2-5).



CAUTION: *To eliminate cable noise emission in excess of FCC regulations, Part 15, subpart J, and VDE specifications 0871 and specification CISPR22 (EN55022) for Class A devices, all interconnection cables should be equipped with shielded connectors, the backshells of which must completely surround the cable shield.*

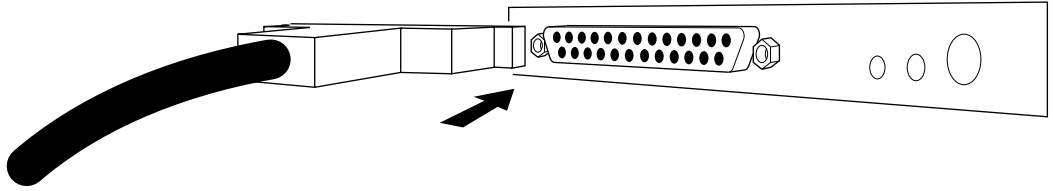


Figure 2-5 HSS V.35 or RS-232 Cable Connection to 25-Pin Connector Port

- b** Install and cable any other I/O modules, referring to the appropriate I/O module installation guide.

When you have finished installing all I/O modules, refer the *NETBuilder II Base System Installation Guide* to complete the NETBuilder II base system installation steps.

3

TROUBLESHOOTING AND MAINTENANCE

This chapter describes how to troubleshoot and replace the HSS V.35 module. Malfunctions that can occur include:

- Self-test failure at startup
- Inappropriate network connection (V.35 versus RS-232)
- Nonfunctional module

The following sections describe the symptoms of malfunctions and the suggested corrective actions to take.

Troubleshooting Startup Problems

The following symptoms indicate a self-test failure at startup, or at reset if parameters are set to run a self-test.

Symptoms All diagnostic displays are located on the monitor. The following self-test failure message appears on the connected terminal monitor after the NETBuilder II system successfully loads the system drive software:

```
HSS Self-Test - X - Path Failed
```

The value of X can be 1 through 4 or 1 through 8 depending on whether you have a 4-Slot or 8-Slot NETBuilder II chassis.

Action Remove the V.35 I/O panel and check for bent pins. Check the backplane slot connection. If you cannot correct the problem, and the module fails after removing and reinstalling it, contact your network supplier for assistance.

Troubleshooting Module Failures

The status LED on the connector/LED panel monitors HSS V.35 module performance and provides feedback for troubleshooting. Refer to Table 1-3 in Chapter 1 for a complete list of LED operating states. This section describes the symptoms of common module failures, and the recommended actions for solving the problem.

Symptom The module's status LED is off when there is power to the system and other installed modules are operating.

Action An unlit LED when the system is operating usually indicates that the module itself is disabled. The module may not be properly connected to the NETBuilder II backplane. Remove and reinsert the module. If it is still nonfunctional, replace the module.

Symptom The module's status LED is red.

Action A red LED indicates an error condition. When this occurs, take the steps in the following checklist:

- Check that all cable connections are intact.
- Check that the NETBuilder II base system is operating correctly.
- Check that the system is set up for the correct interface (V.35 or RS-232).
- Check that the network you are connected to is operating correctly.
- Check that the connected serial device is operating correctly.
- Check that the HSS V.35 is operating correctly by using the loopback testing procedure (see Appendix C).

If none of these actions solve the problem, replace the module and/or contact your network supplier for assistance.

Maintaining the HSS V.35 Module

This section describes preventive maintenance you can take and how to replace the HSS V.35 module.

Preventive Maintenance

3Com recommends the following procedures for preventive maintenance:

- Observe the guidelines listed in Appendix A of the *NETBuilder II Base System Installation Guide* for minimum and maximum electrical and environmental requirements.
- Keep the area around the NETBuilder II base system clean; avoid accumulated dust.
- Allow sufficient air space around the NETBuilder II base system for proper ventilation, so that the module is protected from excessively high temperatures.
- Observe ESD guidelines whenever handling the HSS V.35 module.

Refer to the *NETBuilder II Base System Installation Guide* for preventive maintenance tips that apply to the entire system.

Replacing the HSS V.35 Module

If any component in the HSS V.35 module fails, you will need to replace the entire module. The HSS V.35 module is hot-swappable, which means that you can safely remove and install a new one without powering down or rebooting the NETBuilder II base system.

To replace a module, follow these steps:



To perform the following procedure, you may need a small flathead screwdriver.

- 1 Disconnect any network cabling from the HSS V.35 module and remove the cable strain relief bracket (you do not have to remove the bracket itself).
- 2 Loosen the two captive screws securing the module in the slot, by hand or with a flathead screwdriver.

- 3 Release the ejector handles on both sides of the HSS V.35 module by pushing the handles apart.

The HSS V.35 module will disengage from the NETBuilder II backplane and partially eject from the slot.

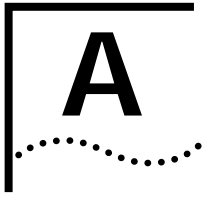
- 4 Carefully slide the HSS V.35 module out of the slot.
- 5 Follow the procedures outlined in Chapter 2 to install a new HSS V.35 module.



CAUTION: *All empty slots require blanking plates to maintain proper cooling of the unit. Failure to replace a removed module with a blanking plate or another module may cause unit failure and will void the warranty. If no blanking plate or other module is available, reinsert the failed module until a replacement is obtained.*

- 6 Perform any software configuration or system restart as detailed in the *NETBuilder Series Bridge Operation Guide* or *NETBuilder Series Bridge/Router Operation Guide*.

Although you can add, remove, or replace the HSS V.35 module while the NETBuilder II system is operating, you may need to reconfigure the software or restart the system before the HSS V.35 module becomes functional.



SPECIFICATIONS

Table A-1 lists the physical dimensions and operating attributes of the HSS V.35 module.

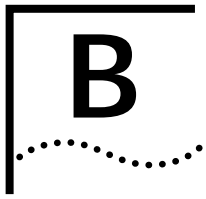
Table A-1 Operating Attributes and Physical Dimensions

Attribute	Description
Length	3.9 inches (9.9 cm)
Width	8.8 inches (22.4 cm)
Height:	
Board	0.6 inches (1.52 cm)
Connector/LED panel	1.0 inches (25 cm)
Weight	0.75 pounds (0.34 kg)
Serial interface	V.35 or RS-232
HSS data rate:	
V.35	Up to 2.048 Mbps
RS-232	Up to 19.2 kbps

Table A-2 lists the maximum current consumption for the HSS V.35 module.

Table A-2 Maximum Current Consumption

+5 Volts	-5 Volts	+12 Volts	-12 Volts
1.35 amps	0.0 amps	0.21 amps	0.038 amps



STARTUP TERMINAL MESSAGES

This appendix describes HSS V.35 module startup messages (both normal and error) that can appear on the terminal. Only a few messages are specific to the HSS V.35 module. You can determine HSS V.35 module status by the status LED on the module's connector/LED panel. Chapter 1, *Overview*, describes the HSS V.35 status LED.

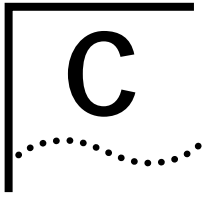
The NETBuilder II base system's power-on terminal messages include a check of the HSS V.35 system. This section describes only messages specific to the HSS V.35 module.

HSS Self test X - Successful

Meaning: This message appears if no errors are found in the HSS V.35 controller tests. The value of X can be 1 through 8, depending on whether you have a 4-Slot or an 8-Slot NETBuilder II chassis.

HSS Self-Test - X - Path Failed

Meaning: This message appears if an error is found in the HSS V.35 controller tests. The value of X can be 1 through 8, depending on whether you have a 4-Slot or an 8-Slot NETBuilder II chassis.



LOOPBACK TESTING PROCEDURES



To run the loopback testing procedures, it is assumed that HSS RS-232 and V.35 software version 6.0 or higher is installed.

Once you have set up and configured both WAN sites and find that you are unable to establish a connection between the two, complete the following procedures to isolate the problem (refer to Figure C-1 and Figure C-2). You can use these procedures to troubleshoot either the V.35 board or the HSS RS-232 board.

Refer to the *NETBuilder Family Bridge/Router Guide* for the following:

- DLTest command (a loopback mode in the 6.0 driver software)
- HSS software settings
- Internal clock source

Refer to the modem manufacturer's documentation for specific settings.

Performing a Local Loopback Test

To conduct a loopback test, complete the following steps.

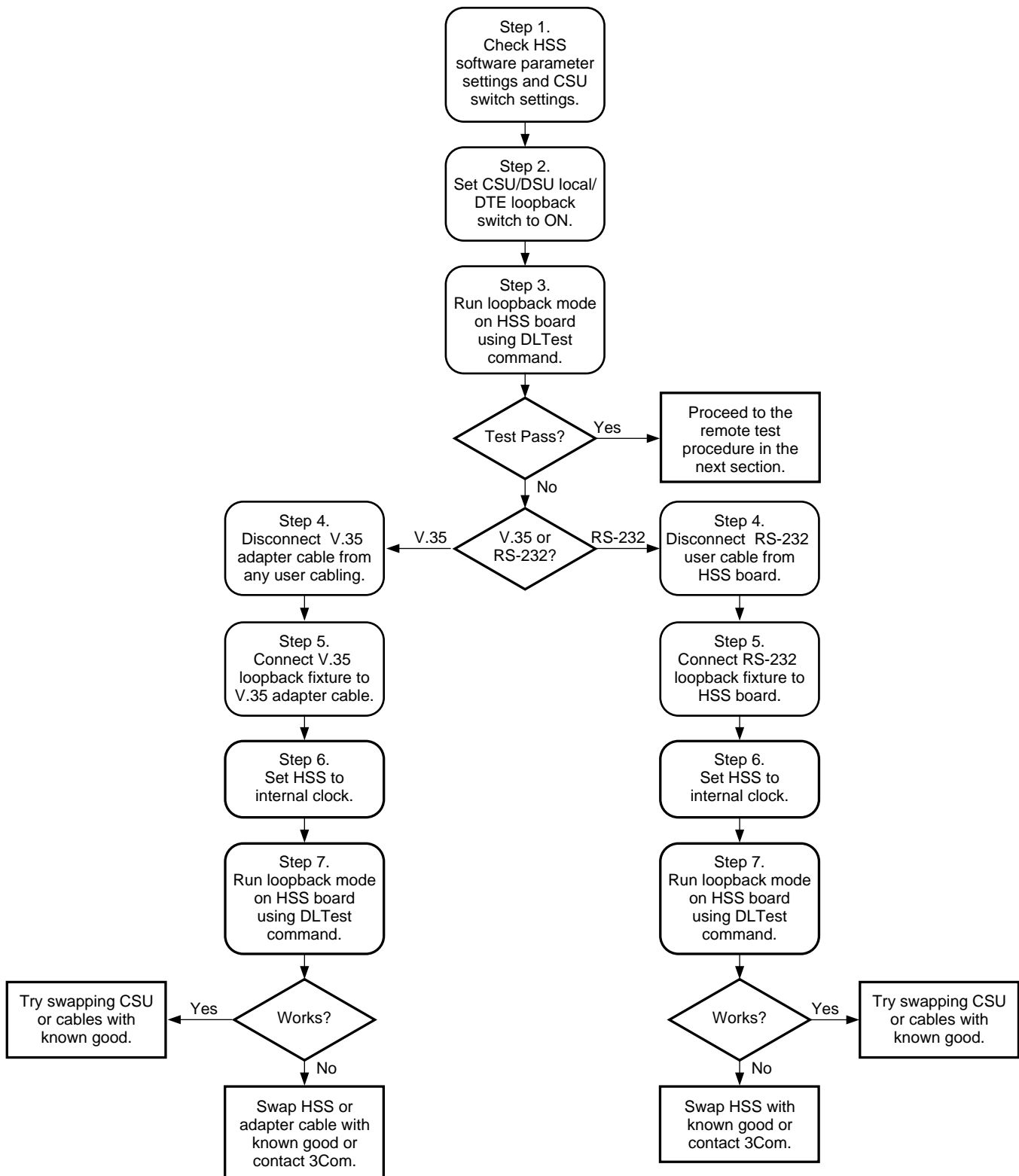


Figure C-1 HSS V.35 and RS-232 Local Loopback Testing Flowchart

Performing a Remote Loopback Test

To perform a remote loopback test, complete the following steps:

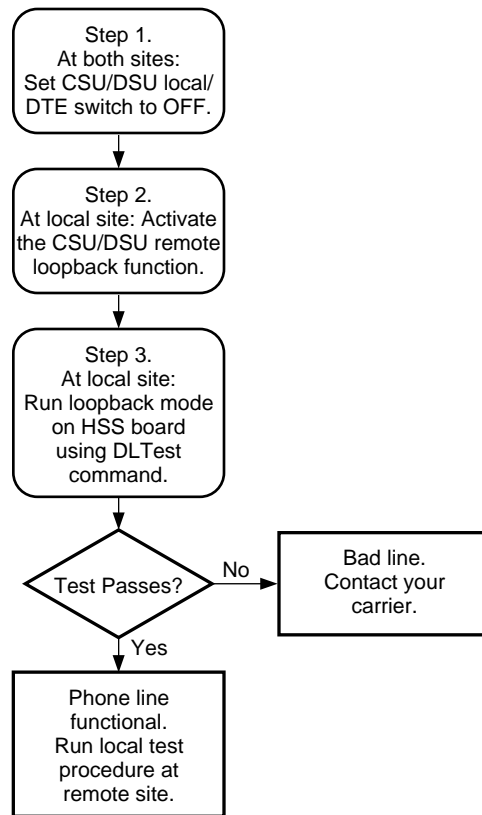


Figure C-2 HSS V.35 and RS-232 Remote Loopback Testing Flowchart

Making the Loopback Fixture



To make the RS-232 loopback fixture, complete the following steps:

Instead of making a custom fixture, you may use a break-out box

- 1 Obtain a male RS-232 connector.
- 2 Wire the pins according to Table C-1.

Table C-1 RS-232 Loopback Pin Assignments

Name	Pin	Name	Pin
			1
TD	2	RD	3
RTS	4	CTS	5
DSR	6	DCD	8
		DTR	20
RXC	17	TT	24

To make the V.35 loopback fixture, complete the following steps:

- 1 Obtain a male V.35 connector.
- 2 Wire the pins according to Table C-2.

Table C-2 V.35 Loopback Pin Assignments

Name	Pin	Name	Pin
SDA	P	RDA	R
SDB	S	RDB	T
SCTEA	U	SCRA	V
SCTEB	W	SCRB	X
RTS	C	CTS	D
DTR	H	DSR	E
		DCD	F
SCTA	Y		
SCTB	AA		